

Lab: Rivers, Streams and Estuaries

marine ecology

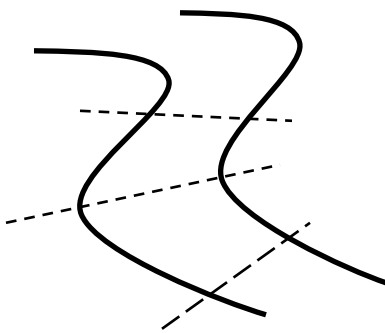
An **estuary** occurs where freshwater and seawater meet and mix. The seawater moves inland from the ocean while the freshwater moves toward the ocean via rivers and streams.

Ultimately, the source of freshwater is precipitation that becomes **runoff** when it flows into streams. The land area that delivers runoff, sediment, and dissolved substances to a stream is called a **watershed** (also called a **river basin** or **drainage basin**). Small streams join to form rivers, and rivers flow downhill to the ocean as part of the **hydrologic cycle**. The downward flow of surface water from mountain highlands to the sea takes place in three different aquatic life zones with different environmental conditions: the source zone, transition zone, and floodplain zone.

Today you will be examining the floodplain zone of our local stream. Within any river or stream, the energy of floodwaters must be dissipated. Depending on the surrounding terrain, this may occur through **downcutting** (downward erosion of the channel) or **meandering** (erosion of the stream banks, leading to looping curves). Downcutting frequently occurs in disturbed areas (ex. Crabtree Creek) and may lead to increased flooding. Meandering is a more natural process, but needs a wide, flat valley called a **flood plain** to dissipate floodwaters. Periodically, meanders loop heavily enough for waters to break through the stream banks, isolating a portion of the stream and creating an **oxbow lake**.

Activity:

- Sketch the section of stream assigned to your group so that it looks something like the example below.
- At the apex of the turn, record the distance across the stream (in meters). Then measure the water depth in the middle and on each side (in centimeters)
- Repeat the distance and depth measurements on each side of the turn as depicted below.



location	distance across meander (m)	depth at inside of meander (cm)	depth at middle of meander (cm)	depth at outside of meander (cm)
left of turn				
apex of turn				
right of turn				

Analysis:

- What trends, if any, do you see in the distances across the stream?
- What trends, if any, do you see in the depths as you move from inside to outside of the meander?
- Are there any objects in the stream that would influence water flow (ex. rock, log)?
- Where does erosion occur within the stream? Where does deposition occur?
- Where do you see evidence of an oxbow lake forming? How long do you think it will take to form?
- How have floodwaters impacted the floodplain?
- At the south end of the stream, where water from the wetland enters, there used to be a beaver dam. How would this dam affect the stream and floodplain?
- Runoff from the schools and tennis center end up in this stream. What evidence do you see of this? What pollutants might be present that you cannot see?
- How is this small stream similar to larger rivers and estuaries like the Neuse River or Chesapeake Bay? How is it different?